October 15, 2009

National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

Attention: Ms. Forestine Robinson, Code 210.0
NASA CS

Subject: Monthly Progress Reports
Contract No. NNG06HX03C
Task Orders: 09-613-01, -02, 09-610-04, 09-614-05, 09-613-07,
09-614-09, -10, -11, 09-581-12, and -13
Support to the Sounder Research Team

Dear Ms. Robinson:

Enclosed please find one copy of each of the task progress reports for the month of September 2009,
prepared by SAIC for the subject contract. If you have any questions regarding these reports, please
direct them to my attention for resolution.

Very truly yours,

NASA/GSFC Division Manager

Enclosure

Monthly Progress Report

Task Title: **Support to the Sounder Research Team**
Task Number: **09-613-01**
GSFC ATR: **Dr. Joel Susskind**

DESCRIPTION OF REQUIREMENT:

This task consists of four subtasks all supporting the goals of the Sounder Research Team (SRT).

Subtask 1: Continued Upgrade and Assessment of the AIRS Science Team Level 2 and Level 3 Products

The AIRS Science Team develops the operational algorithms used by the Goddard DAAC to process data received from the AIRS/AMSU instruments that were launched on the EOS Aqua platform in May of 2002. This algorithm is periodically updated and tested at SRT. Algorithms are then installed at JPL for science and robustness testing and delivery to DAAC. The contractor shall continue to conduct experiments together with government personnel to improve and validate the AIRS/AMSU Level 2 retrieval algorithm and generation of Level 3 products. In addition, the contractor will also perform analogous work on an AIRS only retrieval system to be used as a back-up in the event that AMSU-A should eventually fail, as well as a retrieval system that does not utilize AMSU channels 4 and 5, because these channels have either already failed or are degrading.

SAIC will develop, test, incorporate, and document AIRS algorithm software. Software modules will be tested at GSFC and delivered to JPL for testing 2 months before eventual delivery to the Goddard DAAC. New versions of the operational algorithms are validated and delivered to the Goddard DAAC about once per year. Intermediate results are presented at the AIRS Science Team every four months.

Additional development work shall include improving coefficient and methodology used in the retrieval algorithm and its internal quality flags; optimization of the cloud clearing and cloud retrieval algorithms; optimization of code to compute an estimate of uncertainties for all products; development and optimization of code to determine trace constituent concentrations and surface spectral emissivity; and implementation of an algorithm to indicate the presence of dust in the scene. In addition, the contractor will perform research designed to use this dust indicator to improve quality control and potentially improve retrievals as well. These upgrades will be developed within the SRT system, and then incorporated into the science team algorithm at JPL for eventual delivery to the Goddard DAAC. The contractor shall acquire all AIRS level 1-B, ECMWF and AVN products to be able to run experiments. All retrieved products will be archived until the experiments are no longer needed, as determined by the government. On line disk storage space shall be managed, to be able to run experiments within the confines of the SRT computer resources.

SAIC will examine all experiments produced at GSFC. Typical graphical validation products will include temperature and water profile error plots. Selected plots, such as spatial coverage plots, binned percent accepted SST plots, and binned temperature and water errors as a function of cloud fraction, will be produced at the request of the government.

SAIC will demonstrate that scientifically equivalent results are being produced at GSFC and JPL. The contractor shall also validate AIRS retrieval products produced at the Goddard DAAC in an analogous way to that done with the Pathfinder Path A data. Particularly important is the degree to which TOVS and AIRS monthly mean products are compatible for the overlap time period between TOVS and AIRS. Compatibility is required so that the TOVS climate record can be extended by AIRS products. The contractor will examine this expanded climate record created by using TOVS and AIRS data, and will identify and remove systematic differences, if any are found, to produce a "seamless" multi-year climate data record. Results of these validation studies shall be contained in a bi-monthly report.

Graphics with regard to validation studies of AIRS products shall be provided for publications, presentations, posters, and distribution. There are typically on the order of six such presentations of papers a year. This may include development of new graphical capabilities for presentations as needed.

SAIC will provide to the DMT, and other project groups that we work with, retrieved AIRS products as needed for data assimilation experiments. Included will be a description and code for the latest quality control methodology for proper use in the data assimilation experiments.

Subtask 2: Simulation Studies in Support of CrIS and HES

This requirement supports research the SRT conducts with regard to both the NPP project and IPO in the development of CrIS high spectral resolution IR sounder to fly on NPP and NPOESS, and to the GOES R project in the design of the HES, a High Spectral Resolution IR Geostationary Sounder.

Support of NPP and IPO

SAIC will conduct studies assessing the accuracy of radiative transfer and retrieval algorithms developed by AER for operational analysis of CrIS data on NPP and NPOESS. The AER physics package shall be installed into the Government retrieval package and results of simulation studies using the two algorithms compared to each other. SAIC will also implement and test the AER retrieval package on a proxy global data set and compare the results to those using the Government algorithm with the AER physics and with the Government physics. SAIC will generate global proxy CrIS and ATMS data from observed AIRS and AMSU data to produce the best simulation of CrIS and ATMS observations. Both the AER retrieval algorithm and the government retrieval algorithm shall be tested and evaluated on these proxy data sets. Analogous experiments will also be conducted using simulated CrIS and ATMS data in place of proxy data.

Support for GOES-R

SAIC will conduct research, together with government personnel, using observed AIRS/AMSU data to address issues regarding spectral coverage, spectral resolution, and signal to noise requirements for the HES instrument as well as the need, or lack there of, for a geostationary microwave sounder to accompany HES. Results shall be reported in a bi-monthly report, and as requested by government personnel for presentation in meetings as needed.

Subtask 3 - Technical Support

SAIC will provide technical support to the SRT in the following areas:

1. Technical document preparation for scientific papers, abstracts/proposals, presentations, and lab brochures.
2. Travel documentation support.
3. Support for purchase requests for SRT hardware, software, supplies, and maintenance
4. Maintenance of ADP databases.
5. Record-keeping for SRT, including: active grants, RTOPs, budget, manpower, property, phone lists, facilities requirements, and correspondence/travel.
6. ADP CHIRPS Property Custodian

PROGRESS FOR THE MONTH (INCLUDING MILESTONES AND DELIVERABLES):

Activities performed in the reporting period of September 2009.

Subtask 1: Continued Upgrade and Assessment of the AIRS Science Team Level 2 and Level 3 Products

We focused this month on preparation for the October Science Team meeting. We investigated the spurious trends which other team members reported, and evaluated possible remediation techniques. We found that the regression does not cause these temperature trends; however, using the regression indicators in quality control contributes to trends in yield. The AMSU channels seem to contribute only slightly to the temperature trends. Using the N2O sensitive channels in the temperature retrieval is a significant contributor to the trends. We will propose for Version 6 removing the regression quality indicators and the N2O retrieval channels.

Twice weekly telecons continue with JPL. A general telecon occurs for one hour every other Thursday. In addition, Tuesday telecons discuss the details of new packages and their implementation schedule. On occasion, Wednesday telecons discuss the trends seen in the AIRS data or trace gas retrievals.

Scientific Development

Following a suggestion from NOAA, we removed the N2O channels from the temperature retrieval. A significant decrease in spurious trends resulted from this change and this change was retained for all following runs.

We investigated changing the damping in the surface and emissivity steps when not using the clear regression. These runs did not indicate a significant improvement in results. We then investigated restoring the emissivity retrieval and also the surface temperature retrieval from the clear regression. These runs showed some improvement and this will form the system recommended at the October Science Team meeting.

The change in moving the rho initialization after the second cloud clearing was implemented at JPL. Additional packages were submitted at JPL to begin work on further updates. These included removing the 90 percent cloud check forcing fallback in those cases and fixing a bug in how the startup state is defined for the "microwave" system for purposes of error estimates, in case that system is ever used again.

We investigated AIRS-only systems with and without the clear regression, with only the Ts and emissivity portions of the clear regression, and with and without the N2O temperature channels. The system parallel to the AIRS/AMSU recommended system will be the recommended system at the Science Team meeting.

We provided assistance to Thomas Hearty at the GSFC DISC in running a recent data day through the current system. He previously encountered difficulties and we are studying if new flags must be set to process DAAC version 5.2 Level 1B data. This issue remains unsolved at this time.

We continued evaluating different combinations of variables for use in error estimates for quality control. We reexamined the modification that we made since version-5, which checks the number of atmospheric levels contiguously greater than a set threshold, to determine the profile "good down to a pressure level". For version-5 that number was 3, we since changed that to 8, but now we think that the preferable method uses 8 from the top to a given level, currently 300 mb, and then uses 3 below.

We continue to optimize the code that generates error estimates increasing the flexibility for the number of terms and the combination of terms used.

Continued development is occurring on the programs to produce graphics using GrADS. We are converting all of the existing DIUTL code, which runs on an SGI only, to GrADS which can run on almost any platform. The GrADS software is free and portable.

AIRS Experiments and Data Interpretation

We created new error estimates for the following experiment. We generated error estimates for experiments using September 29, 2004 and August 10, 2007 data.

Data Date	Experiment Name	Description
September 6, 2002 January 25, 2003 September 29, 2004 August 5, 2005 February 24, 2007 August 10, 2007	bi525cnoclrregwon2o	Like bi525c, except without clear regression, without the 2200 cm-1 N2O channels

Date	Run	Description
September 6, 2002 January 25, 2003 September 29, 2004 August 5, 2005 February 24, 2007 August 10, 2007	bi525d	Like bi525cnoclrregwo2no, with less damping in surface and emissivity steps. Not continued forward into other runs.
September 6, 2002 January 25, 2003 September 29, 2004 August 5, 2005 February 24, 2007 August 10, 2007	bi525e	Like bi525cnoclrregwon2o, except with Ts and emissivity regressions back in
September 6, 2002 January 25, 2003 September 29. 2004 August 5, 2005 February 24, 2007 August 10, 2007	bi525f	Same as bi525e, except without Ts clear regression
September 6, 2002 January 25, 2003 September 29, 2004 August 5, 2005 February 24, 2007 August 10, 2007	bi525g	Same as bi525e, except without second cloud clearing
September 6, 2002 January 25, 2003 September 29, 2004 August 5, 2005 February 24, 2007 August 10, 2007	bi525h	Same as bi525e, except with the no-AMSU cloudy regression instead of the with-AMSU cloudy regression
September 6, 2002 January 25, 2003 September 29, 2004 August 5, 2005 February 24, 2007 August 10, 2007	bi525eao	Same as bi525e, except AIRS-only
September 6, 2002 January 25, 2003 September 29, 2004 August 5, 2005 February 24, 2007 August 10, 2007	bi525i	Same as bi525e, except with T and q clear regression. (AMSU-2 step not restored.)
September 6, 2002 January 25, 2003 September 29, 2004 August 5, 2005 February 24, 2007 August 10, 2007	bi525j	Same as bi525e, except with T and q clear regression (and AMSU-2 step restored). This is also like bi525c without the N2O channels.
September 6, 2002 January 25, 2003 September 29, 2004 August 5, 2005 February 24, 2007 August 10, 2007	bi525jao	Same as bi525j, except airs-only

When examining AIRS experiments, we make comparisons against the previous benchmark. We display images of 1x1 daily gridded products of temperature, water, clouds ozone and, emissivity; and line plots for surface skin temperature, temperature, water, and ozone profiles, and emissivity.

AIRS Data Acquisition

As of September 30, AVN data have been acquired through September 29, 2009. We continue to collect AVN data in near real time due to the difficulty of obtaining the data once they are no longer current.

Subtask 2: Simulation Studies in Support of CrIS and HES

Support of NPP and IPO:

Attended SOAT Meeting Telecon September 9 – 11, 2009.

Work continues on analyzing simulated AIRS/AMSU/HSB radiances for September 6, 2002. We ran retrievals for the entire day and processed the results using the appropriate quality control. We generated plots for the different intermediate steps of the retrieval and compared them to each other. Plots were also made comparing simulated AIRS/AMSU/HSB retrievals with CrIS/ATMS retrievals.

For the generation of the level-3 products, we used the AIRS retrieval run bi520 as the truth. These retrievals contain some probable bad retrieval profiles which should not be used in training the error estimate coefficients; therefore we used ECMWF profiles to generate error estimate coefficients for both CrIS/ATMS and AIRS/AMSU/HSB. The CrIS analysis showed results similar to the previous analysis using the truth for quality control. The AIRS analysis was showing unexpected results that warranted further investigation. Retrievals were made trying to duplicate previous runs to identify the problem. It was discovered that the tuning mask file for AIRS had been corrupted. This file was fixed, and the retrieval runs repeated.

Subtask 3 - Technical Support

There was a fire drill exercise this month and the building was evacuated meeting all requirements. We have the responsibility of being a Sectional Fire Warden and Assistant First Floor Fire Warden for building 22 with the task of clearing personnel out of the building during a fire or a fire drill.

For the upcoming move from building 22 to building 33, the Assistant Director for Operations, Jack Richards, requested a listing of all ADP property being used by staff in building 22 that will be moved to building 33 noting what needs to be excess. A spreadsheet was created and sent to him.

Technical document preparation for scientific papers, abstracts/proposals, presentations, and lab brochures

We prepared figures and typed a presentation for the AIRS NetMeeting, held on September 3, 2009.

The issue encountered with being able to read equations in documents created in MS Office 2007 (PC version) and MS Office 2008 (Mac version) when using equation editor in the documents is still pending a solution. ODIN will not install the VMware software any longer as VM Image is replacing VMware. The issue is still pending due to ODIN IT staff checking on alternative solutions that could be more cost effective and to help determine the best solution to resolve this issue.

We reviewed the August 2009 SAIC SRT Monthly Reports making format changes where needed. After receiving the "record of hours" from Corporate, in a table format, they were added to the Monthly Reports. The table format was revised to include a line "total to date planned". We hand carried the hard copy of the Monthly Reports to the COTR and the Contract Specialist with a cover letter and electronically sent Monthly Reports to Corporate, the Project Manager, and to each ATR. We also hand carried a Library Copy (version without "record of monthly hours" noted) of the Monthly Reports and cover letter to the Contract Specialist.

A new Action Item, Code 613 Weekly Report, is due each Wednesday to the Laboratory for Atmospheres Office. Information is collected from the staff, typed and compiled into one report from the SRT, and sent to Code 613 for their action.

NASA GSFC management approved the abstract, DAA and STI forms, for the upcoming 2009 American Geophysical Union Meeting. The approved forms and abstract were uploaded to the electronic GSFC Scientific and Technical Information Program website.

Travel documentation support

NASA and GSFC uses the FedTraveler system Center wide for all government travel related issues. We printout all new guidelines and directives issued each month and update a SRT binder specifically designed for tracking changes to the system.

1. We made airline, car, and hotel reservations for staff to attend the upcoming CERES Science Meeting in Ft. Collins, Colorado, November 2-5, 2009.

2. We updated the travel database noting the upcoming trips to the CERES Science Meeting being held in Colorado and the AGU Meeting being held in San Francisco. .

Support for purchase requests for SRT hardware, software, supplies, and maintenance

We encountered an issue with not being able to log onto SAPGui. We contacted Help Desk for a ticket to resolve the issue.

IFMP/SAP Purchase Requests:
- Last month, we initiated a PR for a CPU processor system costing $35,346.00. The procurement buyer proposed several systems which cost less money, which Dr. Susskind accepted. They buyer also requested revisions to the PR to note 1 PLI with multiple ALI's. It turned out that this was not a necessary action after all, but since this action was taken, the PR had to be re-routed for approval. Many calls were placed to the resource analyst and the procurement buyer to resolve issues incurred when the PR was re-routed and keep it moving through the system in a timely manner.

IFMP/Bankcard/Credit Card Requests:
- PGI Subscription renewal (Fortran compiler for Linux.

Supplies ordered for the SRT using AMMS:
- None

Included the supplies ordered in the AMMS Store Stock Supplies database noting the total cost of each order.

Maintenance of ADP databases

We reviewed the period of performances for ADP maintenance agreements.

Record-keeping for SRT, including: active grants, RTOPs, budget, manpower, property, phone lists, facilities requirements, and correspondence/travel

We updated the SAIC SRT/DMT Contract Monthly ATR Task Summary Report financial spreadsheets for the month of August 2009. We verified, noted, and recorded the contract monthly actual cost figures for each task, including subcontractor tasks totals, for the contract's fourth year. We updated the 'total contract cost to date' formula, and the 'funding received to date' total. Whenever we receive projections for the remainder of the contract period, we update the Projected Additional Funds Needed or the Projected Surplus information. Information for the updates currently comes from the SAIC Contract monthly 533s and the Resource Analyst spreadsheet.

Files continue to be set up to support action items received for the SSAI COTR.

We filed property action reports, publication approval forms, presentation material, and travel forms.

ADP N-PROP (previously CHIRPS) Property Custodian

The Property Account 6132A database was updated in N-PROP:
- Transferred 2 pieces of property from one user to another.
- Requested excess of 1 piece of property.
- Coordinated with IT staff what property needed to be excess.
-

Additional Work Items:

None.

PROBLEMS AND RISKS:

Subtask 1: Continued Upgrade and Assessment of the AIRS Science Team Level 2 and Level 3 Products –
1. Installation at JPL continues be more time-consuming than previously because of significant hardware changes at JPL, access issues, and network constraints. A process to give better access to JPL computers is underway but continues to be bogged down in paperwork and firewall issues at GSFC.
2. The final implementation of removing AMSU channel 5 from the retrieval depends upon receiving new regressions from NOAA. The date of this receipt is unknown.

Subtask 2: Simulation Studies in Support of CrIS and HES - None
Subtask 3: Technical Support - None

WORK PLANNED:

Subtask 1: Continued Upgrade and Assessment of the AIRS Science Team Level 2 and Level 3 Products
1. Install at JPL the changes to reduce the cases of retrievals left behind.
2. Further investigate causes of trends in the retrievals and upgrades for version-6.
3. Attend the October AIRS Science Team meeting.

Subtask 2: Simulation Studies in Support of CrIS and HES
1. Continue with work as directed in task orders and by government staff.

Subtask 3: Technical Support
1. Continue with work as directed in task orders and by government staff.
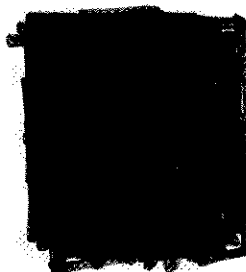
RESOURCE UTILIZATION SUMMARY:

Task Budget This Month:

Expended This Month:

Cumulative-to-Date Planned:

Cumulative-to-Date Expenditure:

Projected Next Month:

Monthly Progress Report

Task Title: **Computer System and User Administration Support to SRT, OSSE and NASATV**
Task Number: **09-613-02**
GSFC ATR: **Dr. Joel Susskind**

DESCRIPTION OF REQUIREMENT:

The purpose of this task is to provide computer systems and user administration support to the SRT, and NASATV.

PROGRESS FOR THE MONTH (INCLUDING MILESTONES AND DELIVERABLES):

Activities were performed in the reporting period of September 2009.

Hardware and Software Support

- Recovered files systems power/SCSI failures.
- Fixed problems with AD on Mac.
- Reinstalled Mac systems after disk failure/curruption.
- Upgraded Lightwave and Maya configured it to work with qube.
- Setup backup script for linux workstation.

Security

- Patched systems to latest patch level.
- Updated Adobe acrobat and flash and java.
- Updated VMare.

User Support

- Provided user support on as need basis.

Account Management

- Updated server accounts.

System Monitoring, Backup and Network Support.

- Provided network support as needed.

Procurement

- Linux server
- Mac laptop and workstations

Property Tracking

- None to report.

Additional Work Items:

- None to report.

PROBLEMS AND RISKS:

- None to report.

WORK PLANNED:

- Work will continue according to the Task Plan.

RESOURCE UTILIZATION SUMMARY:

Task Budget This Month:

Expended This Month:

Cumulative-to-Date Planned:

Cumulative-to-Date Expenditure:

Projected Next Month:

Monthly Progress Report

Task Title: **Ocean Surface Wind Assimilation**
Task Number: **09-610-04**
GSFC ATR: **Michael S. Seablom**

DESCRIPTION OF REQUIREMENT:

This task is dedicated to the evaluation and assimilation of ocean surface wind observations to assess their usefulness in NWP, create consistent climatologies, provide feedback to instrument teams, and to develop innovative ways to assimilate these data to improve NWP. This task also includes software engineering support to the Software Integration and Visualization Office for the implementation and testing of model software on supercomputer platforms.

PROGRESS FOR THE MONTH (INCLUDING MILESTONES AND DELIVERABLES):

Activities were performed in the reporting period of September 2009.

Task 09-610-04a: Off-line VAM Development

No work performed this period.

Task 09-610-04b: Ocean Surface Wind Production Processing and Distribution

CCMP products for the period July to December 2008 were validated and released to the JPL PODAAC.

Progress continues on a publication describing the CCMP data set. Patterns in the mean wind speed difference fields (versus ECMWF) are under investigation. An extensive effort was made to explain the patterns observed over the Arabian Sea in summer. The most probable explanation is cold upwelling in response to the Somali Jet.

The Re-Use working group telecon was attended on September 16, 2009 as part of the ESDSWG requirements under MEaSURE.

Task 09-610-04c: Geophysical Validation

No work performed this period.

Task 09-610-04d: Support for the Sensor Web Simulator

Development efforts for the SWS continued during the month of September in preparation for the final review. The following is a list of activities performed during this period:

- Codes were developed to assess the simulated lidar observations. Several issues were identified and reported. These include problems at the International Dateline, laser timing issues and poor quality in the simulated LOS and full vector wind observations (especially for roll maneuvers).

- Lidar observations were converted to PREPBUFR format for the Full Lidar and Perfect Full Lidar GEOS-5 experiments. Anomaly correlation statistics were generated for a set of 10 forecasts from each of these experiments.

- The interactive targeting software was enhanced to enable users to examine simulated lidar profiles by clicking on a location. Background wind information and clouds from the Nature Run are plotted for reference. Users can also add and delete targets. The modified targets are then written out for rescheduling GWOS to observe these areas.

- Codes for executing various sensor web scenarios using GEOS-5 are being re-written to use the latest software tools. The entire procedure for acquiring and processing GWOS data, identifying targets, scheduling GWOS maneuvers and visualizing the data has changed.
- A bug in the forward model for relating winds to LOS was located and fixed.

The DLSM's horizontal wind component model was enhanced to provide better horizontal wind components for assimilation. A 4-D shot pairing of the simulated forward and aft line of sight DWL winds has been tested and is now available for simulations.

Task 09-610-04e: Support to the Modeling, Analysis, and Prediction (MAP) Project Scientist

Reporting on this task will occur less frequently due to reduced contracting support.

ADDITIONAL WORK ITEMS:

Cyclone track plots were generated for the control, AIRS (standard QC), AIRS (tight QC), and radiance runs for Cyclone Nargis.

New radiance runs using the latest GEOS-5 system (2.1.4) were completed for both the NAMMA (g5_089: August-September 2006) and Nargis (g5_088: April-May 2008) periods. They were used in preparation for publications and presentations showing the impact of AIRS on tropical precipitation. In addition, control runs were also re-done for these two periods using the 2.1.4 system. (g5_090 – Nargis period, g5_091 – NAMMA period). Runs were done under the userid "rirosenb". Various stat plots were generated to compare these runs to others previously done for these periods.

Work began on setting up and running GEOS-5 v2.1.4 forecasts on the NAS computer systems "pleaides". This will be used to test the impact of a new Tokioka cumulus convection scheme in the model.

A new on-site subcontractor staff member joined the group to provide support to this task.

PROBLEMS AND RISKS:

Additional help may be needed to meet task-4b and c deliverables.

WORK PLANNED:

- The GrADS based GUI for viewing and modifying targeting results (Sensor Web Simulator) will continue to be enhanced to include more comprehensive functions.
- GEOS-5 assimilation experiments will continue using simulated data from the DLSM.
- Figures and remaining unresolved items will be concluded for the BAMS article on the CCMP data set.
- Visualizations will be developed for the phase-1 final review of the Sensor Web Simulator.
- All GEOS-5 assimilation experiments that were done using earlier versions of GEOS-5 will be re-run using system 2.1.4 (also called the "MERRA" system), to ensure consistency when comparing results.

RESOURCE UTILIZATION SUMMARY:

Task Budget This Month:

Expended This Month:

Cumulative-to-Date Planned:

Cumulative-to-Date Expenditure:

Projected Next Month:

Monthly Progress Report

Task Title: **Support to the Hydrological Sciences Branch**
Task Number: **09-614-05**
GSFC ATR: **David Toll**

DESCRIPTION OF REQUIREMENT:

This task is to support the Hydrological Sciences Branch in the areas of Land Data Assimilation System (LDAS) land surface modeling; computing system support; water management consulting; microwave satellite data observation support; research coordination, management and document support; assimilation of GRACE terrestrial water storage data and related applications support; and web site development and support.

PROGRESS FOR THE MONTH (INCLUDING MILESTONES AND DELIVERABLES):

Activities were performed in the reporting period of September 2009.

Task 09-614-05a: Land Data Assimilation Systems (LDAS)

Subsection 1: Participate in the investigation, development, verification, and validation of new land data assimilation capabilities within the Land Information System (LIS), including assisting with the development and testing of LIS on Air Force Weather Agency architecture.

- Continued with the implementation of the coupled LIS-WRF system. The LIS-WRF system (that uses WRF 3.0) was successfully compiled on discover using a newer version of Intel compiler (version 11). The system is currently being tested and revisions to update to WRF3.1 are ongoing.
- Continued a suite of data assimilation simulations using the ISCCP land surface temperature observations. The updated quality control process used in Noah simulations was found to improve the data assimilation performance. The scaling parameters are being tuned to see if the assimilation performance of the scaled Noah simulations can be further improved. An initial draft of the journal article lead by ▆▆▆▆▆▆▆ was developed.
- Presented initial results from the data assimilation integrations using the ANSA snow data at the AFWA mid-term review. The data integrations examined the assimilation of AMSRE SWE, MODIS snow cover observations, individually and simultaneously. The initial results showed improvements over the default Noah model simulations. These experiments are being repeated using the higher resolution (5km) ANSA data to investigate the effects of scale on the results. In preparation for this, worked with Mike Shaw to debug the current ANSA processing algorithm.
- LIS6 implementation on NOHRSC was found to have problems running the Alaska domain. In order to expedite the debugging process, we are working with Greg Fall at NOHRSC to gain access to their computing environment.
- Continued to assist Anil Kumar and Karen Mohr in the use of the LIS-GCE system and in the comparison of the test case results with the uncoupled GCE model.
- A preliminary meeting was held regarding possible NASA/GSFC participation in the LandFlux land evaporation project. GSFC would use the LIS6.0 framework to simulate several different U.S.-based land-surface models, including multiple versions of the same LSM. The models under consideration include: Noah2.7.1, Noah3.x, CLM2, CLM3.5, Catchment, and multiple versions of SSiB, possibly including HY-SSiB and COLA SSiB. The forcing dataset would come from EU Watch (Water and Global Change) and is at 0.5-degrees between -56 South to 84 North, and would have a reporting period from 1985 to 1999, which should be preceded by at least 5 years (1980-1984) spin-up.
- The following orientation to the project activities were performed in support of LIS at Offutt Air Base:
  - More familiarization with ANSA and related datasets, formats, processing tools, etc. to point of modifying code and successfully generating new products.
  - Continued working through getting Totalview debugger running with LIS at AFWA and on NCCS (NASA) machines.
  - More orientation with METv2.0 (Model Evaluation Toolkit version 2.0).

- Attended DA/ensembles/verification (probabilistic forecasting and uncertainty) workshop at NCAR.
- The following additional activities were performed in support of LIS at Offutt Air Base:
  - Continued reading through UCAR METv2.0, reviewing JAAWIN verification output and talking with AFWA QC team regarding adapting MM5 verification scripts to LIS, and reviewing documentation on LVT (LIS Verification Toolkit). Attended UCAR DTC ensembles workshop, and more literature review for ideas and refreshment.
  - Continued to reviewed ANSA code and datasets. Modified ANSA code for new resolutions. Generated (and continuing to generate) ANSA snow blend products at 5km and 0.05 degree resolutions (versus previous 0.25 degree resolution).
  - Continued to work with grib and netcdf manipulation (writing, merging, parsing, stats, etc.; NCO, CDO, etc.) packages. Installed CDO and others. Using CDO, e.g., to facilitate netcdf/GRIB conversion and manipulation toward GFS interpolations from raw 64 level vertical grid to 26 level isobaric grid.
  - While flexibility had previously been enabled in LIS ingestion of polar stereographic gridded precipitation (SSMI, GEOPRECIP), similar flexibility has been enabled in ingestion of 0.25 degree SSMI and 1/10th degree GEOPRECIP datasets. These modifications are now being implemented in the latest version of LIS with its new treatment of gribDescriptions.
  - Attended mid-term review at GSFC for exchange of NASA and AFWA respective status regarding LIS and CMORPH tasks.
  - Found COP datasets over CONUS to be readily available, but found global COP (via CDFS II/WWMCA) to only be in development and not to be ready until probably early to mid next year. Informed NASA personnel of this.
  - Developed and implemented scripts and approach for 1) interpolation of GFS model output ozone to 26 level GFS files and 2) reliable conversion between netCDF and GRIB formats (including, e.g., GRIB codes, naming of variables, etc.).

Subsection 2: In cooperation with Joint Center for Satellite Data Assimilation personnel develop the ability to couple LIS through the Earth System Modeling Framework (ESMF) to the NCEP GFS/GDAS.

- No time was spent on this subsection during September 2009.

Subsection 3: Develop techniques and models for the interpretation, assimilation and validation of satellite radiance datasets for surface and atmospheric observations from various NASA, NOAA, Department of Defense, and international partner missions, including contributions to the development of radiative transfer modules for operation in LIS.

- Continued to improve the SW/LW flux calculation with RTM and satellite observations. Edited NCL code to analyze the correlation between SGP observation and the simulated land surface properties with NLDAS, AGRRAD, and Fu-Liou calculated radiative flux forcing. Used the SGP land surface measurements (e.g. SWATS data) to validate the model simulation of latent and sensible heat. Analyzed the sensitivity of simulated soil moisture, temperature, sensible heat to different forcing input.
- Started to work on the radiative flux comparison work. Designed a work plan of the flux comparison. Downloaded Ameriflux L3 data and initially edited NCL code to read and plot the data. Started literature survey about the radiative flux cross comparison between different data products.
- The plugin implementation for processing SURFRAD observations in the LVT system was tested. This plugin is capable of processing the native SURFRAD station observations which are produced at 1 minute intervals. This capability will be used for the evaluation of the Fu-Liou implementation (by Jing Zeng).
- Organized a brainstorming meeting with Dr. Rolf Reichle and Dr. Wade Crow for the design of radiance assimilation OSSE using CRTM. The input provided by them is being utilized in the design of synthetic soil moisture OSSE.

Subsection 4: Provide development and application of the coupled LIS-WRF system to include stochastic optimization and uncertainty assessment tools using ESMF technologies.

- Led the interim review presentation for the AIST project. The updated quad chart and the interim review presentation were submitted to the ESTO project website. Subsequent to the review, a list of wrap up items was developed and the project team is close to completing them. The list of wrap-up items includes an ensemble-based implementation of LM, testing of restart options for all algorithms, source

code documentation and the development of standardized test cases. The team also discussed the design of an experiment that examines the use of parameter estimation for improving the data assimilation performance. A synthetic experiment based on this design is currently being set up. The team also started the design of an uncertainty of modeling infrastructure in LIS, which is the primary focus of the next phase of the design. The required changes in the core parts of LIS and an initial implementation of the GLUE (Generalized Likelihood Uncertainty Estimation) method were completed. The implementation is currently being tested for the Walnut-Gulch test cases.

- Prepared two abstracts for presentation at the upcoming ECMWF/GLASS workshop on land surface modeling and data assimilation; 1) use of inverse modeling and posterior inference tools for land surface modeling and data assimilation, and 2) role of subsurface soil moisture physics in the assimilation of surface soil moisture observations.

Subsection 5: Perform development and evaluation of LIS to provide improved ensemble hydrologic predictions, including ensemble streamflow simulations.

- Performed more tuning of ensemble Kalman filter and analyses for the data assimilation study.

Task 09-614-05b: Computing and Systems Support for LDAS and Related Computing Platforms

- Troubleshoot ECMWF FTP transfer issues for Matt and Hiroko
- Worked with Paul in configuring new web server/options as he worked on LDAS site
- Meet with Jack and Torry about ICESAT move to H004 and UPS integration
- Troubleshoot amazon crash for Gustavo
- Troubleshoot h2o crash for Gustavo
- Looked briefly into memory leak issues Gustavo has on both his servers
- Troubleshoot freezing up of cascade
- Review bid items for procurement and do tech eval
- Renamed hosts to new convention (hsbserv, Baikal)
- Determined catchment model has huge memory leaks when run on cascade
- Procure OpenMP support for Absoft compiler on Cascade
- Obtain VAST license and install on cascade
- Review patchlink block list for 9/2 from Emyre in 606
- Review automatic reboot issues Gustavo was seeing
- Make needed permission changes to folders on the new webserver for Paul
- Troubleshoot L1 crash for Hiroko
- Excessed a large batch of old equipment out of downstairs computing areas/office
- Meet with 2009 Peer Award Committee, send out call for nominations
- Find out who uses PGI and for what projects for Christa
- Help Rasmus with large file transfers to Cascade
- Review patchlink block list for 9/9 from Emyre in 606
- Troubleshoot slowness and drive issues on HSB for Dave Mocko
- Determine Red Hat training dates and schedule classes with instructor
- Troubleshoot RAID controller error on L2 for GLDAS group
- Work with Torry on Scott's laptop configuration and Odin transfer
- Troubleshoot X-win32 login issues for Wenge
- Procure new power adapter for Sujay
- Troubleshoot ftp and ssh from L1 for Hiroko
- Compile list of libraries from Lily to put on new compute nodes
- LIS data review and data consolidation meeting with Scott, Sujay and Yudong
- Troubleshoot /INPUTS1 falling offline for Bailing
- Troubleshoot Hydros leftover web files coming back after Paul deleted them
- Data at Rest (DAR) encryption deployment project meeting
- Remove McAfee and install Norton on remaining servers
- Red Hat cluster dropped SAN connection after kernel upgrade, rebuilt kernels on all nodes
- Review FREEZE day patchlink block list for 9/16 from Emyre in 606
- Test hsb website for Paul, review publication list and reported errors

- Review Smartcard deployment plans from center
- Recover backed up files on hsb for Bhaskar for new website
- Review NCAD migration plans from Center
- Check specifications for Google Earth Pro on server for Mike
- Review patchlink block list for 9/22 from Emyre in 606
- Discuss system categorizations and data requirements with various branch members for center request
- Submit request to Idmax for NCAD Resource Admin account to keep SA privileges on systems
- Troubleshoot LIS website permissions for Fran
- Reviewed software practices of MIKE models and addressed concerns for Mike Jasinski about feature requests vs. intellectual property
- Attended Active Directory working group meeting
- Troubleshoot lwg1 login issues for Yudong
- Review patchlink block list for 9/28 from Emyre in 606
- Help Judy track down some items that needed to be decontrolled
- Staged new SA laptop for me after old one completely crashed
- Troubleshoot PKI with CNE
- Revisit catchment model memory leak, review computer architecture, core, processor, node, thread and process differences with Bailing and Rolf
- Updated and patched systems as needed
- Troubleshoot password issues and RAID mount failures as needed

Task 09-614-05c: Water Management Consulting

- Participated in a telecom regarding the Yukon River Basin proposal and developed a plan for re-submittal as a Feasibility proposal.
- Participated in the SMAP (Soil Moisture Active Passive) applications workshop.
- Participated in the Applied Sciences Water Resources Principle Investigators meeting.
- Prepared two presentations for the African Water Cycle workshop at the WMO headquarters in Geneva, participated in the meeting, and developed a trip report.
- Reviewed an NSF proposal.

Task 09-614-05d: Microwave Satellite Observation Support

- No time was spent on this subsection during September 2009.

Task 09-614-05e: Management and Document Support

- Continued to maintain a master budget spreadsheet that contains individual task/contractor budgets and a rolled-up summary of the HSB Branch Head's (BH) project budgets.
- Updated, based on interim review comments, and re-submitted the slides for the interim report of the *Integration of Data Assimilation, Stochastic Optimization and Uncertainty Modeling within NASA LIS* AIST08 project.
- Coordinated gathering materials from team staff, produced the financial status graphic, and drafted the mid-term review presentation for the AFWA09 project, *LIS NPOESS Preparation Tasks*. Continued to assist with mechanics of the Interagency Agreement with NOAA/CPC on the AFWA09 project.
- Reviewed the draft SOW and developed a draft budget for the proposed AFWA10 project.
- Reviewed and edited the presentation slides for the *Improving NOAA/NWS River Forecast Center Decision Support with NASA Satellite and Land Information System Products* project presented at the NASA Water Resources PI meeting held at the University of Maryland.
- Routinely attended team meetings of the BH's projects and held weekly meetings with the BH. Maintained a spreadsheet to track action items/issues across the BH's projects that is reviewed at the weekly meetings.
- Compiled the monthly report for Task 5 and provided the report to the Program Manager.

Task 09-614-05f: Assimilation of GRACE Terrestrial Water Storage Data and Related Applications

- Debugged a new version of Catchment on Cascade.
- Prepared GRACE data for global modeling.
- Conducted more analyses on SCAN and NLDAS-Noah soil moisture and precipitation analyses.

Task 09-614-05g: Web Site Development and Support

- The publications listed on-line were updated for the Land Information System project. At the end of the month, the LIS website designed by the contractor went live as the official project website at http://lis.gsfc.nasa.gov.
- The Principle Investigators funded by the NASA Applied Sciences theme of Water Resources had a meeting, their first in two years. Prior to the meeting, the Water Resources website was updated to show the current schedule of upcoming meetings and to reflect the current Science Highlights of the various project categories. Subsequent to the meeting, the Water Resources website was updated to display a summary of results from the meeting.

ADDITIONAL WORK ITEMS:

- LIS user support has been provided to several groups, including folks at SpoRT center, USDA (Wade Crow), NASA SIVO, and others internally at HSB.

PROBLEMS AND RISKS:

None.

WORK PLANNED:

Work will proceed as outlined in the task plan.

RESOURCE UTILIZATION SUMMARY:

Task Budget This Month:

Expended This Month:

Cumulative-to-Date Planned:

Cumulative-to-Date Expenditure:

Projected Next Month:

Monthly Progress Report

Task Title: **Model Development**
Task Number: **09-613-07**
GSFC ATR: **Dr. Eric Wilcox**

DESCRIPTION OF REQUIREMENT:

The contractor shall support land-atmosphere interaction simulations and projects within the Laboratory for Atmospheres, including the following activities:

i) Improve cloud microphysics of McRAS using ARM-CART datasets in SCMs.

ii) Implement and evaluate McRAS with cloud-aerosol microphysics into the GEOS5 GCM.

iii) Development of a parameterization for the ice phase of the cloud-aerosol indirect effect.

iv) Evaluate the benefit of these improvements and additions in the GMAO GEOS5 AGCM.

PROGRESS FOR THE MONTH (INCLUDING MILESTONES AND DELIVERABLES):

The transfer of the McRAS moist processes with aerosol indirect effect code was completed. Numerous meetings were held to discuss the code and run procedures. The GEOS-4 and GEOS-5 GCM code packages were prepared and a set of run procedures was documented. McRAS Single Column Model (SCM) drivers for several aerosol forcing datasets were prepared, tested, and delivered to several users. A transfer of all programs related to present and past work was made, and several of the plotting routines used for GCM analysis were reviewed.

A series of McRAS GCM simulations were prepared in order to test a modified aerosol parameterization. Ammonium sulfate aerosols are now being used as condensation nuclei for both ice and liquid, and a series of tuning simulations were performed. As the simulations were being prepared and run, hands-on meetings were held to show the procedures. A revised ammonium sulfate dataset was obtained and interpolated to the SCM and GCM grids.

ADDITIONAL WORK ITEMS:

None.

PROBLEMS AND RISKS:

No new problems.

WORK PLANNED:

Continued assistance will be provided to personnel that will be taking over work on this project over the next few months. Meetings to review code and model run procedures will be conducted.

RESOURCE UTILIZATION SUMMARY:

Task Budget This Month:

Expended This Month:

Cumulative-to-Date Planned:

Cumulative-to-Date Expenditure:

Projected Next Month:

Monthly Progress Report

Task Title: **Code 614 Computer Systems Management**
Task Number: **09-614-09**
GSFC ATR: **Dr. Rosa Kao**

DESCRIPTION OF REQUIREMENT:

The purpose of this task is to provide system and user administration support for the Code 614 staff. This includes hardware and software activities, security, user support, account management, system monitoring, backup support, network support, procurement and property tracking assistance.

PROGRESS FOR THE MONTH (INCLUDING MILESTONES AND DELIVERABLES):

Activities were performed in the reporting period of September 2009.

Hardware and Software Support

- Deployed Mac and windows Laptops / workstations.
- Installed idl, and other open source software like elmer.
  Deployed raid disks.

Security

- Patched Mac, Windows and Linux.
- Responded for data call for Adobe and Firefox java.

User Support

- Provided user support on as needed basis.

Account Management

- None to report.

System Monitoring, Backup and Network Support

- Market research for backup software, backup to local disk on going.

Procurement

- Dell workstations
- HP servers
- Mac server for backup
- MAC workstations
- Microsoft office
- Adobe pro products
- Windows laptop
- Mathlab Idl

Property Tracking

- None to report.

ADDITIONAL WORK ITEMS:

- None to report.

PROBLEMS AND RISKS:

- None to report.

WORK PLANNED:

- Work will continue according to the Task Plan.
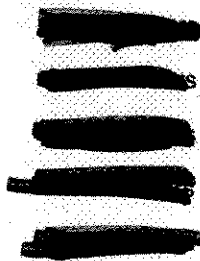
RESOURCE UTILIZATION SUMMARY:

Task Budget This Month:

Expended This Month:

Cumulative-to-Date Planned:

Cumulative-to-Date Expenditure:

Projected Next Month:

Monthly Progress Report

Task Title: Ice Sheet Glaciology with Remote Sensing
Task Number: 09-614-10
GSFC ATR: Dr. Robert Bindschadler

DESCRIPTION OF REQUIREMENT:

Provide technical support of glaciological research conducted with remote sensing and field data. Duties include computer programming, system administration, technical writing of reports and professional papers, occasional attendance at conferences, and occasional field work.

PROGRESS FOR THE MONTH (INCLUDING MILESTONES AND DELIVERABLES):

Activities were performed in the reporting period of September 2009.

Task 09-614-10a: Develop algorithms to extract glaciologically significant parameters and products from a combination of remote sensing and surface field data of ice sheets.

- ASAID PROJECT

Updated two of the software modules. "ROI_tool1_4" was updated to "ROI_tool1_5", and "File_edit1_B" was updated to "File_edit1_C". New functions in both modules are the ability to restart with new grounding line files and the ability to save the currently-drawn grounding line. Several bugs were also fixed.

- DEM PROFILER SOFTWARE

The program "GL_profiler_1" was created, and development continues. Completed functions are:
1. Importing Bamber, RAMP, and ASTER DEMs.
2. Applying rotation and subsetting consistent with those of the photoclinometry DEMs derived from the ASAID software.
3. Plotting elevation profiles along the grounding line.
4. Adding EGM96 geoid values to the Bamber and RAMP elevations, and converting from Topex ellipsoid to WGS84 ellipsoid for photoclinometry elevations.

Task 09-614-10b: Apply remote sensing data to support investigations led by other agencies.

- LIMA (Landsat Image Mosaic of Antarctica)

Provided more feedback to improve the USGS web site. Several problems persist and these were reported to USGS personnel during a telecon. The Seamless Download is in the testing phase and results of using it were also reported. Discovered that some NLAPS scenes are missing from the Download data web site.

- PIG (Pine Island Glacier)

Downloaded new GPS station data acquired by UNAVCO.

- ASTER GDEM

Requested that ████████ at the University of Maine order three Level 1A scenes of the Cape Prudhomme Bay, Antarctica area. After obtaining them each was processed through the Silcast software package to generate

Level 1B, Ortho, and DEM images of each. They were mosaicked, reprojected, and resampled to allow linking of the images and profile plots with those of the ASTER GDEM product. The comparison revealed that the GDEM product may be usable to extract surface elevations in the grounding zone, after all. In some places it was even superior to the individual-scene DEMs which was an unexpected result.

- ICESat-2

Determined that the Landsat-7 ETM+ Band 4 tiles of Greenland previously downloaded will not be processed through the high-pass frequency filter. Close inspection of the images revealed that they had in fact been manipulated by Photoshop. The data were manipulated in such a way that the results of applying the filter would be meaningless.

Contacted W. Krabill of NASA Wallops Flight Facility to obtain ATM (Airborne Topographic Mapper) data of Greenland. Received the processed data on DVD. They include a calculation of surface roughness along each flight path. This roughness value will be compared with the qualitative roughness we previously calculated by applying our high-pass filter to the MODIS Mosaic of Greenland (MOG).

Requested SAR image mosaics of Greenland from I. Joughin at the University of Washington. These have a 25-meter resolution and will be compared to the altimeter-derived and image-derived roughness maps described above.

- ASAID grounding line mapping of Antarctica

Thirty Landsat-7 ETM+ scenes were examined and processed. Coastal areas mapped include northern Marie Byrd Land, Wilkes Land, and Victoria Land.

New task personnel successfully trained in the use of the ASAID software package, and quickly became productive with minimal supervision. Review of the work by the ATR was excellent, and led to the addition of the task of identifying ice sheet transition type for sections of the grounding line.

Task 09-614-10c: System administration of research computers and workstations

Regular data backups and system and software updates were performed.

Received a new Dell computer system and installed ENVI, IDL, and other utilities.

Prepared several old computers for removal to excess by reformatting their hard drives.

Task 09-614-10d: Assessment of digital elevation models

Work on this project was superseded by the Antarctic grounding line mapping (section 10b), which is more urgent at this time.

ADDITIONAL WORK ITEMS:

Reviewed the exhibit "Antarctica: Collected works from the bottom of the world" at the Maryland Science Center in Baltimore, and provided a verbal evaluation via telephone interview.

PROBLEMS AND RISKS:

Application for NASA-affiliation of an existing WIST user account still has not been approved. This will allow the ordering of ASTER data products free of charge. A temporary workaround was found but the original request is still pending.

A 36-gigabyte internal option disk failed on the SGI workstation.   Since the system is covered by full maintenance the drive was quickly replaced. No data were lost.

WORK PLANNED:

Proceed with the Antarctic grounding line mapping until all required sections of coastline are complete. This is very high priority.

Work on the Greenland ice sheet surface roughness study as time permits.

Continue development of the DEM profiler code.

RESOURCE UTILIZATION SUMMARY:

Task Budget This Month:

Expended This Month:

Cumulative-to-Date Planned:

Cumulative-to-Date Expenditure:

Projected Next Month:

Monthly Progress Report

Task Title: **Scientific Outreach/Public Communicator/Education Support**
Task Number: **09-614-11**
GSFC ATR: **Dr. Rosa Kao**

DESCRIPTION OF REQUIREMENT:

Education activities shall consist of developing an education plan for the Hydrospheric and Biospheric Sciences Laboratory; assisting scientists in the preparation of appropriate material for the education section of new proposals; and formulating and preparing education material for inclusion into the Laboratory and Division (Earth-Sun Exploration) web pages.

In addition, the Contractor would serve as the Laboratory public liaison for flight, field, and research projects; help compile and organize an information data base of who has what, who does what, who knows what; and who is an effective public communicator.

PROGRESS FOR THE MONTH (INCLUDING MILESTONES AND DELIVERABLES):

Activities were performed in the reporting period September 2009.

Task 09-614-11a: *Play a role in the development and structuring of educational projects through proposal writing and project partnering.*

1. Task lead received the 2009 Robert H. Goddard Award for Excellence in Outreach at a ceremony held on September 22, 2009 at the Goddard Space Flight Center.

2. The NASA ICESat mission exhibit, designed by task lead, has now been set up at the Orlando Science Center, Reading Public Museum and Planetarium, and the NASA GSFC Visitors Center. Task lead is currently reviewing 1-year results from the exhibit locations.

3. Continued reviewing and editing the Hydrospheric and Biospheric Sciences Laboratory's science highlights.

4. Continued work on the "Faces of Antarctica": Education and Outreach project using the new Landsat Image Mosaic of Antarctica (LIMA)" with ▬▬▬▬▬▬▬

5. Continuing to incorporate ICESat Digital Elevation Model (DEM) data of global vegetation, cloud and aerosol height curtains, and sea ice onto the Science on a Sphere (SOS) at the Goddard Space Flight Center Visitors Center and 34 SOS units internationally. Currently working on getting binary and ascii files of ICESat aerosol and cloud curtains, and blowing snow data onto SOS.

6. Task lead is a member of the NASA IPY Education Council, GSFC Formal Education Working Group, and the GSFC Education Implementation Team.

7. Task lead continues to be the Chair for the NASA GSFC Science Communication Working Group.

8. Task lead has completed and submitted the 2009 ICESat E/PO Senior Review Implementation Plan to NASA Headquarters. As part of the plan, task lead is also spearheading a new project called, "Know Your Earth", which will bring vital global climate change science questions into nationwide movie theaters as part of the National CineMedia's (NCM) Lobby Entertainment Network (LEN).

9. Task lead is working on Phase B of the education and public outreach activities for the new Soil Moisture Active Passive (SMAP) mission. Task lead is the GSFC E/PO lead counterpart to JPL.

10. Task lead serves as a member of the Port Discovery Museum Education Advisory Council in Baltimore, MD.

11. A NASA IRAD proposal entitled, "Exploring the Fascinating World of Tiny, Microscopic Plants of the Sea from the Sky Above" was accepted for funding. Task lead serves as a Co-Investigator. This proposal is

in collaboration with the Coastal Observation Project based at the NASA Wallops Flight Facility and the Smithsonian Museum of Washington D.C.

Trips Taken:

1. None

Task 09-614-11b: *Align all education work to that of NASA Headquarters science and education plans, initiatives, and mandates.*

1. Continued to be part of the NASA INSPIRE Education Panel. This is a panel of select Education/Outreach personnel from every NASA center.
2. Continued working with the Maryland Science Center's Traveling Science Program and task lead's "Hydrosphere 101"program.
3. Task lead is a member of the NASA IPY Education Working Group led by M. Ying-Wei of NASA HQ.

Trips Taken:

1. None

Additional Work Items:

None.

PROBLEMS AND RISKS:

None.

WORK PLANNED:

1. Continue to update ICESat data on the "Science on a Sphere" and NASA Earth Observations (NEO) tool.
2. Continue Phase B E/PO planning for the new Soil Moisture Active Passive (SMAP) Mission. This mission is a partial rebirth of the planned, but cut Hydrospheric states (Hydros) Mission.
3. Develop additional lessons for the LIMA education program.
4. Maintain and update 3 ICESat exhibits in Florida, Pennsylvania, and Maryland.
5. Work on upcoming programs for the ICESat-II mission.
6. Task lead will conduct 4 student/teacher mini-workshops at Stephen Decatur Middle School in Berlin, MD on October 9, 2009.
7. Task lead is hosting a 3-day Coastal Observation Teacher Workshop to be held at the NASA Wallops Flight Facility on October 14-16, 2009. This workshop is for 25 NASA Explorer School teachers from the NASA Glenn Research Center..

RESOURCE UTILIZATION SUMMARY:

Task Budget This Month:

Expended This Month:

Cumulative-to-Date Planned:

Cumulative-to-Date Expenditure:

Projected Next Month:

Monthly Progress Report

Task Title: **GPM GVS Development**

Task Number: **09-581-12**

GSFC ATR: **Dr. Mathew Schwaller**

DESCRIPTION OF REQUIREMENT:

The purpose of this task is to provide systems development support to the Global Precipitation Measuring (GPM) Mission Ground Validation Segment (GVS).

PROGRESS FOR THE MONTH (INCLUDING MILESTONES AND DELIVERABLES):

Activities were performed in the reporting period of September 2009.

1. _Statistical Cross-Validation Prototype Development:_

    a. In support of the Validation Network (VN) prototype, completed a user's manual for the PR vs. GR reflectivity statistical analysis and display technique. Began work on a document describing the full VN data acquisition procedures, database, and scripts.

    b. Completed revisions of a first draft of a paper to be submitted to the Journal of Oceanic and Atmospheric Technology (JOAT), based on internal reviewer's remarks.

    c. Continued preparations to attend and present a poster on the VN Prototype at the AMS 34th Radar Meteorology Conference. Put together and printed the poster, and wrote and submitted the paper for the proceedings.

2. _Systems Engineering Support for GVS Documents Development:_

    a. None required.

3. _Systems Engineering Support for GVS Management/Planning:_

    a. None required.

4. _Re-Use Analysis:_

    a. None required.

5. _Systems Administration Support_

    a. Performed routine Linux updates and data backups on ws1-gpmgv. Installed IDL 7.1 and related operating system updates.

6. _Additional Work Items:_

    a. None.

PROBLEMS AND RISKS:

None.

WORK PLANNED:

- Continue software development for the Validation Network prototype:
    - Support the submission of the draft GPM VN JAOT paper to NASA review and to the AMS.
    - Present the VN poster at the AMS 34th Radar Conference, and run demonstrations of the visualization and statistical software.
    - Prepare the software package for the open source release of the visualization software, once final approvals for release are completed.
    - Assist in preparation of materials for the next round of GPM project reviews.
    - Respond to science team and participating agency requests for VN data and software.

- – Investigate code changes required to incorporate new and reprocessed PR Version 7 products into the VN data ingest and processing stream, once the new V7 format is known.
- – Develop specifications for a data server and/or additional storage for the GPM GV, as ws1-gpmgv storage is down below 50% free after adding KWAJ data.
- – Develop and test scripts to update the VN data on the TRMM GV ftp server on a routine basis.
- – Manage the backfilling of PR data in the VN dataset and database, once the missing PR data are released.
- • Incorporate feedback from the GV Advisory Panel into the GPM GV design and processes.

RESOURCE UTILIZATION SUMMARY:

Task Budget This Month:

Expended This Month:

Cumulative-to-Date Planned:

Cumulative-to-Date Expenditure:

Projected Next Month:

Monthly Progress Report

Task Title: **NPP SDS Support**

Task Number: **09-581-13**

GSFC ATR: **Dr. Mathew Schwaller**

DESCRIPTION OF REQUIREMENT:
The purpose of this task is to provide systems engineering in support of requirements of the NPOESS Preparatory Program (NPP) Science Data Segment (SDS).

PROGRESS FOR THE MONTH (INCLUDING MILESTONES AND DELIVERABLES):
Activities were performed in the reporting period of September 2009.

1. _Acquire, build and install VIIRS SDR product generation software:_

    a. No activity this month.

2. _Validate built VIIRS SDR software with test data:_

    a. Reviewed test procedures for upcoming NPP Ground Systems Interface Test (GSIT). Examined list of data types to be made available in the test, and determined those needed by NICSE. Participated in project-wide ADS/CLASS-SDS telecons, and provided NICSE input to action items assigned to NICSE group.

3. _Assist SDS developers in the use and operations of the VIIRS SDR software:_

    a. No activity this month.

4. _Analyze requirements for management of VIIRS calibration and validation data in the NPP SDS:_

    a. No activity this month.

5. _Conduct studies on implementation options for management of VIIRS calibration and validation data_

    a. No activity this month.

6. _Additional Work Items:_

    a. Supported regular NPP SDS telecons.
    b. Arranged to have an account set up the NPP DocuShare system to allow NICSE access to GSIT documentation. Verified access to the system.

PROBLEMS AND RISKS:
None.

WORK PLANNED:
- Review team response to external data requirements. Review and update NICSE data storage spreadsheet as needed to support this effort.
- Continue VIIRS SDR software build and test effort:
    - Move necessary test data sets to the NICSE Applications Server.
    - Run the Geolocation, Solar Diffuser, and Bright Pixel components of the VIIRS SDR code inside the NICSE environment.
    - Check CasaNOSA web site for any available updates to SDR code and test data.
- Run NICSE interface tests with the web interface of SD3E when this capability is made available.
- Review test procedures for the upcoming Ground Systems Interface Test (GSIT), and prepare for NICSE's participation in the test, once it is scheduled.

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RESOURCE UTILIZATION SUMMARY:

Task Budget This Month:

Expended This Month:

Cumulative-to-Date Planned:

Cumulative-to-Date Expenditure:

Projected Next Month: